

North Dakota Station.—H. O. Werner has resigned as horticulturist to accept a position as State potato specialist at the University of Nebraska.

Oklahoma College and Station.—Walter Stemmons, college and station director, resigned October 10 to accept a position with the Connecticut College.

Rhode Island Station.—George E. Merkle, assistant in chemistry, has resigned.

Utah College and Station.—A plant industry building is being erected to house eventually the departments of botany, horticulture, and agronomy. During the period of the war the building will be used for barracks for the Students' Army Training Corps.

Willard Gardner, Ph. D., has been appointed assistant physicist and meteorologist.

Virginia College and Station.—S. C. Harman, instructor in agronomy and assistant agronomist, resigned October 1 to take charge of agricultural work at the high school at Driver, Va., and has been succeeded by F. S. Glassett.

Washington College and Station.—Howard Hackedorn, extension assistant professor of animal husbandry in the University of Missouri, has been appointed professor of animal husbandry and animal husbandman of the station, assuming his duties early in October.

Wyoming University and Station.—K. T. Steik, associate professor of chemistry and engineering chemist, has been granted a year's leave of absence for graduate study at the University of Chicago. P. T. Miller has been appointed head of the department of chemistry and associate research chemist.

Clark V. Singleton has been appointed assistant in animal husbandry, and Miss May Kinney assistant in the wool investigations.

Association of Official Agricultural Chemists.—Announcement is made that owing to the housing congestion and Spanish Influenza epidemic in Washington, D. C., and other reasons, no meeting of the association will be held this year. A meeting of the executive committee has been called to consider current matters and make arrangements for the coming year.

Necrology.—David Ernest Lantz, specialist in the destruction of noxious rodents in the Bureau of Biological Survey of the U. S. Department of Agriculture since 1904, died in Washington, D. C., during the recent epidemic of Spanish influenza. Professor Lantz was for many years professor of mathematics in the Kansas State Agricultural College, as well as librarian. He was the author of numerous bulletins dealing with the destruction of prairie dog gophers, rats, etc.

William H. Bishop, professor of agriculture in the National Farm School at Doylestown, Pa., since 1903, died July 1, aged 59 years. He was a graduate of the Massachusetts Agricultural College in 1882 and was for 12 years professor of agriculture at the Delaware College. He had also been superintendent of agriculture at Tongaloo University, Miss., and horticulturist at the Maryland Experiment Station.

Conservation of Paper by Farm Journals.—Under regulations of the War Industries Board, effective October 1, a 15 per cent reduction in the consumption of print paper must be made by agricultural periodicals during the coming year. Among the means to be adopted to effect this saving are the discontinuing of free copies except for service rendered. Some exceptions are made to this requirement, however, among them being Government departmental libraries which use these publications in their work, agricultural institutions, experiment stations, and employees of National and State departments of agriculture who use the publications for public service.

EXPERIMENT STATION RECORD



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EXPERIMENT STATION RECORD.

VOL. 39.

OCTOBER, 1918.

No. 5.

The intimate relation of our agricultural institutions to reconstruction measures affecting agriculture lends a special interest to the steps which are being taken by other countries in this direction. This interest increases as the war progresses and it becomes more evident how far-reaching and radical its effects are upon all our industries. It is seen with respect to agriculture that many of these influences and changes will be of a permanent character, while the effects of others will be felt in modified form. All need to be taken account of to the permanent interest of the industry.

The readjustment of agriculture to the changed conditions and changed point of view will afford an unusual opportunity for strengthening its position and bringing about improvements in country life long advocated if proper guidance is exerted. There will be many problems to be worked out and many conflicting interests to be met, which will call for a strength and courage supported by clear vision and exact knowledge of the facts. This gives enlarged opportunity and new obligations to our agricultural institutions, which must be largely relied upon for wise leadership and stimulation in working out and promoting quite definite policies. It should give them a position of unusual influence.

A notable example of timely preparation for agricultural reconstruction is furnished by Great Britain, where the position taken is of particular interest because it involves some of the most radical suggestions regarding agriculture which have been put forward anywhere, representing a revolution in the attitude toward food production and the use of land.

Matters relating to reconstruction have commanded attention in that country for some time, reflecting the conviction that the problems and adjustments must be anticipated as far as possible and the answers or proper courses of action determined before instead of after the close of the war. At the outset this matter was in the hands of a cabinet committee, but later more definite provision was made by the appointment of a special committee headed by the Prime Minister, which was commissioned "to anticipate the urgent

difficulties of the future and to provide in advance as far as possible for the ready adjustment of the machinery of government to the new tasks which will need to be put in hand without delay at the conclusion of the war."

Both of these committees were active and work was started in various subcommittees, but in July, 1917, the Government decided that a stage had been reached which required a Ministry of Reconstruction, and this was established to continue during and for a period of two years or less after the war. A special agency was constituted which was made responsible for the investigation of the whole field of probable readjustment and reconstruction after the war. It was to provide for research—not in the field of the physical sciences but into questions of political science—and it constituted an official agency to which suggestions might be submitted, insuring a broad and thorough consideration of measures proposed by governmental or private agencies before they are presented for legislation. The object was thus to build up in consultation with the various departments of the Government a thoroughly considered policy of reconstruction in all its branches for submission to the cabinet.

Certain committees previously appointed were continued, some of which have since reported, and for purposes of administration the new department was divided into branches, with one on rural development. An advisory council was also provided to assist in considering the many and varied proposals which come before the department, one section of which deals with agriculture; and to insure breadth of view in this council each of the various sections has represented in its membership all of the principal interests embraced in the council as a whole.

Under the head of rural development the ministry is working among other things, on land settlement in association with the Board of Agriculture, and the material is being brought together for a review of the land question as a whole. Studies have been made of the working of the Small Holdings Act of 1908, and of proposals for war allotments of land, and a committee on land acquisition has reported. On the basis of a committee report on forestry a scheme has been prepared for the consideration of the Government; and a plan for the organization of county officers for advice and information on agriculture has advanced sufficiently far to be brought to the attention of the advisory council for discussion.

Special interest attaches to a comprehensive report on the subject of agricultural policy, recently completed and published by the Ministry of Reconstruction. This report is the work of a subcommittee on the subject, appointed in August, 1916, to consider and report

the methods of effecting an increase in the home grown food supplies, having regard to the need of such increase in the interests of national security.

Early in the war Mr. T. H. Middleton, assistant secretary of the Board of Agriculture and Fisheries, prepared a most interesting and instructive pamphlet on *The Recent Development of German Agriculture*. In this, it will be remembered, he reviewed the history and position of British agriculture in comparison with that of Germany, and called sharp attention to the difference in the policy pursued by the two countries toward that industry, with their effects. This frank report attracted quite widespread attention, and some of its conclusions as to the effects of persistent neglect of British agriculture were emphasized as the war progressed. In a measure it prepared the way and served as a background for the work of the committee on agricultural policy.

This committee undertook a comprehensive inquiry into the prevailing condition of agriculture, the causes and influences which had been operative over a long term of years, and a frank statement of the results. The necessity for the Government taking steps to promote increased food production led to the submission of certain of its findings and recommendations in an interim report nearly two years ago. This strongly emphasized the need for a new agricultural policy, and recommended that as a war measure the State should fix minimum wages for agricultural labor, guarantee minimum prices for wheat and oats, and authorize steps to secure the proper and efficient use of land for agricultural production. A synopsis of this first part of the report has been made in these pages (*E. S. R.*, 38, p. 42), and it is interesting to note here that the "corn production law" passed by the Government embodied these chief recommendations of the report.

The full report of this committee has now appeared, including the second part which records the studies made on other phases of the question. Its scope is broader than that of the first part, and it embodies along with its recommendations an interesting survey of agricultural institutions, organizations, existing practices with reference to land tenancy, agricultural holdings, taxation, etc. It thus supplies a large amount of general information in condensed form not readily available elsewhere.

For the promotion and administration of agricultural affairs in the United Kingdom there are three departments of agriculture. The first in order of establishment is the Board of Agriculture for Great Britain, which was originally charged merely with the administration of certain acts of Parliament. Then came the Irish Department of Agriculture, founded about 1895 with the definite

idea of promoting a constructive agricultural policy; and finally in 1911 Scotland severed its agricultural administration from that of England and Wales under a separate board of agriculture. The three departments are conducted and administered independently of one another, leaving no single agency responsible for the agriculture of the whole realm.

The committee recognizes that it would have been better for agriculture if there had been only a single department for the Kingdom, and reflects the view that the dispersion of agriculture between three offices has undoubtedly lessened the influence of the agricultural interest in the cabinet, and contributed to the lack of public concern for this most vitally important national industry. It does not, however, recommend a union at this time, but proposes step by step the three departments be brought into conference on agricultural matters affecting the whole United Kingdom, and strongly suggests that the board for England and Wales be materially enlarged and strengthened.

The later board was originally created by royal charter in 1786, which lapsed with the discontinuance of Parliamentary grant in 1822, and was revived nearly thirty years ago. It was charged with the administration of certain acts and the collection of statistics and had no responsibility for the development of the industry. With the change of public opinion it gradually expanded its activities in aid of agriculture, but the committee expresses the view that it is not yet wholly adequate, and that it should become "a great department of state charged with the care of agriculture in its widest sense and with the promotion of the welfare of rural as distinct from urban life. Its duties should be to assist and stimulate agriculture by every possible means as a basic national industry, to promote the production of food in England and Wales, and to regard the increased prosperity and happiness of the rural population as its special care. It should also encourage and cooperate with voluntary organizations which exist for the promotion of these objects."

It is recommended that the department be brought together in an adequate building, that its staff be increased and strengthened, and that the status of the administrative officer in charge be raised to that of the presidents of other important boards. At present the department has assigned to it the subject of fisheries, which from its importance the committee suggests might well be turned over to a separate ministry.

The war agricultural committees which have been set up in England and Wales under the county councils it is advised should be replaced by statutory committees working under the Board of Agriculture. The formation of national agricultural councils

England, Scotland, and Wales, are outlined, in addition to the existing agricultural council in Ireland, and it is suggested that representatives from these councils meet for conference at stated intervals with a view to encouraging more harmonious action.

Considerable space is devoted to the subject of agricultural education and research, and it is urged that farmers should have placed at their disposal "the best available scientific and practical advice." So much importance is attached to this matter and to the material development of existing facilities for agricultural education, technical advice, and research that it is made a necessary condition of success in effecting the proposed changes in the industry. The subject, it is thought, should be under the control of the Board of Agriculture in England and Wales, instead of the county councils as at present, and the system supported from the public treasury.

"Agricultural education must be pressed forward in every county as a fundamental part of a national agricultural policy: the nation can no longer afford to incur the risks of local and short sighted innovation: it must, therefore, give full powers to the president of the Board of Agriculture and put the responsibility on his shoulders. It follows, therefore, that the public exchequer and not the local rates must bear the financial burden." An improved ruralized curriculum for elementary and secondary schools is also advocated.

The report expresses appreciative commendation of the research work which is being done in agriculture, and recommends that it be extended and given stronger support from public funds. It urges that "this is productive expenditure which will bring in to the State manifold return. . . . The evidence that has been laid before us has amply shown the ultimate value of pure scientific research and the dependence of the development of the industry upon investigation that is independent of any apparently important practical end."

One line along which more adequate data is urged is in relation to the cost of production of staple agricultural products. The disturbed condition produced by the war has emphasized this necessity and has reflected clearly the absence of fundamental economic data connected with the industry. The Institute for Research in Agricultural Economics at Oxford represents a beginning in this direction, but it has been at work for too short a time and on too small a scale to be able to supply what has proved to be so desirable to the proper understanding of the industry and its part in the national life.

Another great need cited is the establishment of an institute for research in agricultural machinery. Such an institute would have, it is thought, a stimulating effect upon the development of machinery

to meet the rapidly changing conditions of agriculture, and upon men responsible for the designing of agricultural implements. It would also insure better instruction in farm machinery at the agricultural colleges where the subject has been very inadequately dealt with in the past. Itinerant advisors on mechanical questions should, it is thought, be a part of the equipment of county instruction.

Apart from research, attention is called to the necessity of providing local experiments on a commercial scale throughout the country, and the possibility of cultivating crops not at present grown, and the development of various rural industries closely linked with agriculture. The promotion of sugar-beet growing was dealt with in the first part of the report, and it is believed that provisions should be made for experiments with various other agricultural crops. Specific recommendations are also made with reference to selection for the improvement of live stock, under the Board of Agriculture. Plans are also suggested for demonstration and illustration farms, and for the establishment of a limited number of larger demonstration farms run on business lines. Other suggestions are made for enlarging and strengthening the scheme for local aid and advice to farmers.

The belief is expressed that women may play a great part in the reconstruction of agriculture after the war and that their intellectual interest in country life must be aroused if an increased rural population is to develop. "The fact is that local conditions which have brought about rural depopulation, bad housing, low wages, lack of prospects, affect women even more than men, and that the influence of women might have been exerted in the opposite direction if they had been taught to make more comfortable homes with less drudgery, and if they had the necessary knowledge to enable them to build up the social order in which the natural advantages of the country life could be made to counterbalance the artificial attractions of the town." The war emergency has led a considerable number of women to undertake farm work, and it is urged that their continuance in the country should be stimulated and given every possible encouragement, along with better opportunities for their education and assistance.

The importance of agricultural organization and cooperation is emphasized, and additional support from national funds is favored for existing agricultural organization societies. It is not felt that the cooperative movement can become established within any reasonable measure of time without State assistance, and it is the definite opinion that it can be better developed on a voluntary basis than as an institution of Government. Agricultural credit also comes in for quite lengthy consideration, and recommendations are made for

cheapening and simplifying the procedure in respect to loans, for the provision of short term credits through cooperative trading societies and farmers' central trading boards, and for making available for this purpose the deposits in the postal savings banks.

As would be expected, questions relating to land and its use in agriculture occupy a prominent place in this report and in the framing of a national agricultural policy. The systems of land ownership and tenancy in the United Kingdom have long been subjects of discussion as to their ultimate effect upon the agricultural industry and the rural question, from which have resulted the many measures for providing small holdings and for making possible the acquisition of land by small farmers. The questions involved are too complicated to be entered into in detail here and have only an incidental interest in this country.

The committee declines to express any general opinion as to the comparative productivity of large farms and small holdings, but is outspoken in its belief that both forms of holdings are essential if the most is to be made out of the land and of country life. It holds that the national life will be strengthened by a greater diversity of tenure and types of holding, that a large increase of small holdings is necessary, and that the latter is the surest means of increasing rural population, which is so greatly desired. This matter is also discussed with reference to providing holdings for demobilized soldiers and sailors, for which a considerable demand is anticipated.

A strong plea is made for village reconstruction, in order to improve social conditions and make life there less stagnant. Illustrations are cited of what has been done in that direction through enterprising leadership, and it is maintained that "no agricultural policy will be worth having which does not aim at a better developed social life in our villages, at the introduction of fresh industries into the country districts, and at a large increase in the rural population."

Considerable prominence is given to a variety of questions turning on the relations of landlord and tenant as to occupancy of land, compensation of tenant for unexhausted improvements, for damage by game, for dispossession by reason of sale, etc., and for compensation of landlords for deterioration of holdings, as well as questions relating to the use of the land by tenants for fruit growing and market gardening. These matters are largely governed by existing law and custom, and in light of the evidence secured recommendations are made applying to many of them.

The possible extension of agricultural areas by reclamation, drainage, and other means was naturally included in such an inquiry. An instructive memorandum by Sir Daniel Hall, former director of

Rothamsted, is submitted which shows that the area brought under cultivation in England increased year by year up to 1892, but ceased with the great fall in agricultural prices, as reclamation did not repay costs. Opportunities for reclamation on a reasonably large scale are furnished by marsh and tide lands, low lying moor and bog, and blown land adjoining the sea, large expanses of sandy heath, and upland sheep pasture.

While no large expectations are held out in this direction the experience of other countries is cited, and it is concluded that "a quantitative program of land reclamation can be formulated until an agency has been constituted to take up and investigate the merits of each proposition that presents itself." The establishment of reclamation and land drainage authorities for each of the three kingdoms is recommended, and attention is directed to the necessity of legislation and of inquiry into the principles on which land should be acquired by the State for reclamation.

It is estimated that in Scotland there are some 3,600,000 acres of land devoted exclusively to deer forests and sport, quite a portion of which might be used for agricultural purposes. A special survey is advised to determine the areas suited to sheep farming and other agricultural purposes.

Among other matters to which attention is given are provisions for the control and eradication of pests of various kinds, plant diseases and weeds, the adequate supply of fertilizers, weights and measures, and facilities for the transportation of agricultural products and supplies.

The extraordinary diversity of weights and measures employed in the sale and purchase of agricultural products is pointed to as a minor but no less real disadvantage, peculiar to British agriculture. Three systems of weights and measures have legal authority in the United Kingdom, but apart from these, local or customary measures are found in almost every county or district, with the result that there are something like twenty-five local measures or weights used in the sale of wheat alone, while twelve different bushels, seven gallons, thirteen pounds, ten stones, three hundredweights, and nine different tons are in existence. As the report says, the result is confusion, misunderstanding, and ground for minor litigation, which are detrimental to the industry and place the producer at an obvious disadvantage in dealing with those more experienced in market operations. The matter is recommended for the consideration of a special sub-committee; and the same position is taken with reference to adequate transportation.

In the conclusion of its report the committee reverts again to the recommendations made in its interim report and enacted in the

emergency measure known as The Corn Production Act. It strongly urges the necessity after the war of enacting in a permanent statute the principles embodied in the act, providing a guaranty of the price of wheat and oats to secure stability of conditions to all who live upon the land, a minimum wage to insure to the agricultural laborer his fair share of the profits of agriculture, and a power in reserve to the State to influence the use of land to the greatest national advantage. It is maintained that unless this is done "there can be no hope of the people of the United Kingdom becoming emancipated from dependence on supplies of foodstuffs brought from over-seas, or of the increase of our rural population."

The illuminating feature of this report is not alone the changes which are deemed essential for the reconstruction of British agriculture, but the illustration it gives of what is necessarily involved in defining and developing a definite agricultural policy for such a country. The framing of a program involving such radical change and development reflects the new attitude and sentiment in Great Britain which have come out of the war.

Special emphasis is laid upon the fact that the recommendations made by the committee have not been asked for by land owners or farmers, but have been made exclusively in the national interest and not in that of any individuals or class of individuals.

Criticisms of the principles involved in the interim report have been severe on some points, reflecting especially a conflict of interest between the plans proposed and those of individuals for developments in other directions. These criticisms reach to the very heart of the wisdom of encouraging agriculture in Great Britain, some of them wholly ignoring the value to the nation of a mixed rural and urban population, and in effect denying any place to agriculture in the national life. This position is strongly controverted by the committee, which expresses its mature conviction of the importance to the country of providing a stable and resourceful agricultural industry competent to meet the needs of the country in a considerable measure. Not only is this maintained as good economic policy, but the advantage of an increased rural population with opportunity for development and with a fuller sense of social unity is emphasized as an essential asset in national welfare.

British agriculture has been the subject of numerous royal commissions and committees since the depression set in some forty years ago. The difficulty which its supporters on these occasions have experienced has been to secure any general acceptance of the principle that a prosperous agriculture was so essential to the national life as to justify the changes implied. But the necessities of the war have

brought about a changed relation between the State and agriculture which was recognized in the Corn Production Act, and other far-reaching reforms are necessary if this relation is to be maintained and the greatest production from the land insured.

It will be noted that many of the provisions and viewpoints urged in this program have been under consideration in this country, and some have been put into effect by enactment of suitable legislation. This is true of most of the steps advocated for agricultural education and instruction, local aid to farmers, rural credit, etc. But there remain to be solved many broad questions relating to the industry and the conditions surrounding it in this country, as well as the people living by it. These economic and sociological questions will be more insistent in the future and will deserve a large measure of study.

RECENT WORK IN AGRICULTURAL SCIENCE.

AGRICULTURAL CHEMISTRY—AGROTECHNY.

Edible oils and fats, C. A. MITCHELL (*London: Longmans, Green & Co., 1918, VII+159, pls. 4, figs. 4*).—This volume is one of the series of monographs in industrial chemistry edited by E. Thorpe. It includes a concise outline of the chemical composition and properties of the more important oils and fats, together with a description of the methods of extracting them from the crude materials, and of purifying and preparing them for food purposes. The physical and chemical methods of examining edible oils are described and tables of physical constants are given. The manufacture of hydrogenated oils and of margarin is described in detail. An extensive bibliography is appended.

The chemistry of linseed oil, J. N. FRIEND (*London: Gurney & Jackson, 1917, VII+96, figs. 2; rev. in Analyst, 43 (1918), No. 506, p. 186*).—This volume is one of a series of chemical monographs edited by A. C. Cumming. It contains an introductory section on the classification of oils and waxes, and sections on the manufacture, chief constituents, and properties and reactions of linseed oil, on the chemistry of linseed oil and linoxyn, and on polymerized and rancid oils. An extensive bibliography is appended.

Attempts at biological saponification of different fatty substances of the French colonies (*Bul. Off. Colon. [France], 11 (1918), No. 12, pp. 227-234*).—A study is reported of the hydrolyzing action of the lipase of the castor bean on various little-known fats and oils of the French colonies. Certain oils were found to contain in themselves a saponifying ferment.

Chemistry of the cotton plant, with special reference to Upland cotton, V. BOUVER, L. H. CHERNOFF, and C. O. JOHNS (*Jour. Agr. Research [U. S.], 1 (1918), No. 7, pp. 345-352*).—This paper, which is the first of a series of papers from the Bureau of Chemistry of the U. S. Department of Agriculture on the chemistry of the cotton plant, describes the isolation of the glucosides and their products from Upland cotton (*Gossypium hirsutum*), and reports preliminary studies of an ethereal oil which has been isolated from different parts of the cotton plant.

The leaves and flowers with petals removed were found to contain quercimeritrin, while the petals contain both quercimeritrin and isoquercimeritrin. No glucosides have been found of gossypitrin and gossypetin, which have been isolated from other types of cotton. An ethereal oil was isolated from *G. hirsutum*, which is different from that found in the bark of the root of *G. herbaceum*. It boils mainly between 200 and 300° C., and leaves a black empyreumatic residue. The lower fractions of the distillate have a yellow to greenish-yellow color, the higher fractions light blue-green to dark blue. This oil proved to be toxic to the boll weevil.

A chemical examination of the loganberry, M. R. DAUGHTERS (*Oregon Sta. Bul. 151 (1918), pp. 10*).—This publication includes the history and economic importance of the loganberry and analytical data on its chemical composition. Some of the analytical data have been previously noted from another source.

(E. S. R., 39, p. 9). The constants of the oil extracted from the finely ground dried pulp by means of petroleum ether (boiling point, 44 to 65° C.) are as follows: Sp. gr. 0.926, refractive index 1.4811, solidifying temperature -10.5°, iodine number 158.32, and saponification number 179.8.

As judged by these constants, it is considered that the oil will make a good substitute for linseed oil as a drying oil.

A bibliography of 39 titles is appended.

Loganberry juice, C. I. LEWIS (*Oreg. Countryman*, 10 (1918), No. 9, pp. 369-370).—A brief description is given of the methods of procedure in the commercial manufacture of loganberry juice.

By-products of the fermentation of cabbage, V. E. NELSON and A. J. BARNES (*Jour. Amer. Chem. Soc.*, 40 (1918), No. 6, pp. 1001-1005).—Commercially fermented cabbage was examined for its content of acids, alcohols, and esters as follows:

Five hundred gm. of the canned cabbage was made slightly acid with sulphuric acid and distilled with steam until 2 liters was collected. The volatile acids in the distillate were titrated with $\frac{N}{10}$ barium hydroxid, with phenolphthalein as an indicator, and the alcohols and esters were distilled from the barium salts until 50 cc. was obtained. This solution was then saponified with 10 cc. of 20 per cent potassium hydroxid, and the alcohols distilled off, concentrated to 50 cc., and oxidized on the water bath with a solution of potassium dichromate in sulphuric acid. The acids resulting from the oxidation of the alcohols were distilled and converted into barium salts. The potassium salts of the acids formed in the saponification were then decomposed with dilute sulphuric acid, distilled, and the distillate titrated with $\frac{N}{10}$ barium hydroxid. Both sets of acids were then subjected to the Duclaux method for analysis and estimation.

The results of seven analyses showed that the volatile acids represented a considerable proportion of the total acidity and consisted of acetic and propionic acids only, except in two cases in which formic acid was isolated. Lactic acid in the inactive form was the only fixed acid obtained. Alcohols were found to the same extent as volatile acids and consisted entirely of ethyl and propyl alcohols. The esters were found in small amounts, but evidently contributed largely to the odor and flavor of the product. Mannitol was found to the extent of from 2 to 2.5 per cent.

The pungent principles of ginger.—I, Zingiberone. (A correction.) H. NOMURA (*Sci. Rpts. Tôhoku Imp. Univ.*, ser. 1, 6 (1918), No. 5, p. 375).—The author proposes to substitute the name "zingerone" for zingiberone, previously noted (E. S. R., 37, p. 612), as the ketone bears no relation to the sesquiterpene alcohol to which the name zingiberone has been given.

A study of the antiseptic properties of certain organic compounds, I. J. KLIGLER (*Jour. Expt. Med.*, 27 (1918), No. 4, pp. 463-478).—For the purpose of studying the structural chemical factors involved in the action of dyes on bacteria a series of representative organic compounds, mostly of the aromatic series, was selected, and their action on a number of typical bacteria was studied quantitatively under carefully controlled conditions. The results are expressed in tabular form, the compounds being arranged in the order of their increasing antiseptic power. The following tentative conclusions are drawn:

The higher the concentration of organic nitrogenous compounds in the medium the lower is the effective concentration of the dye. The reaction of the medium modifies the specific action of the antiseptic. The antiseptic power is apparently increased by an increase in the number of alkyl radicals, is increased

to a greater extent by an ethyl than by a methyl group, and is increased by the introduction of a methyl group in the nucleus. The simple anilin derivatives, as well as the dyes, are more toxic for the Gram-positive than for the Gram-negative organisms. The most marked specific selective effect is manifested by the triphenylmethane dyes.

Improved methods for the estimation of sodium and potassium, S. N. RHUE (*Jour. Indus. and Engin. Chem.*, 10 (1918), No. 6, pp. 429-431).—The author, at the Ohio Experiment Station, has devised improvements in the modification of the official method for the estimation of sodium as described by Forbes, Beegle, and Mensching (*E. S. R.*, 29, p. 807). The general principles of the method are the same, but changes of detail have been devised which shorten the process and involve the use of much less platinum. In the ashing of the substance the principle of the second optional method (in which the little sulphuric acid used is entirely driven off) has been followed, and porcelain dishes are used instead of platinum. After the precipitation of the phosphorus in the solution of the ash as magnesium ammonium phosphate, the ammonium salts are destroyed by digestion with nitric and hydrochloric acids, these acids being finally driven off, first by evaporation and then by baking on the hot plate.

The official Lindo-Gladding procedure for the estimation of potassium has been similarly modified as to ashing and digesting the ash. The modified methods for both sodium and potassium are described in detail.

The testing of sodium bisulphite in the laboratory of the A. V. R. O. S., F. C. VAN HEURN (*Arch. Rubbercult. Nederland. Indië*, 2 (1918), No. 1, pp. 12-21; *Meded. Alg. Proefstat. Alg. Ver. Rubberplanters Oostkust Sumatra, Rubber Ser.*, No. 6 (1918), pp. 12-21).—The author states that technical samples of sodium bisulphite generally contain, in addition to the bisulphite itself, some sodium sulphite and sodium sulphate ($\text{Na}_2\text{SO}_3 + \text{NaHSO}_3 + \text{Na}_2\text{SO}_4$). The second component is most valuable, while the third is quite worthless. In dissolving the sample for analysis the sodium bisulphite becomes sodium sulphite plus sulphurous acid ($\text{Na}_2\text{SO}_3 + \text{H}_2\text{SO}_3$). Taking this into consideration, the following method of analysis has been developed:

About 1 gm. of the material is weighed in a weighing tube, a small quantity of water added, and the solution poured into a graduated glass-stoppered volumetric flask and made up to 1 liter. This solution is used for all determinations.

To determine the amount of sulphur dioxide (SO_2) present as real bisulphite, 100 cc. of the solution is placed in an Erlenmeyer flask and titrated with $\frac{N}{10}$ potassium hydroxid, using phenolphthalein as an indicator. Double the quantity of SO_2 found is present as bisulphite. This amount multiplied by $1.63 \left(\frac{\text{NaHSO}_3}{\text{SO}_2} = 1.63 \right)$ gives the maximum amount of sodium bisulphite that can be present.

To determine the total amount of SO_2 , some of the original solution is placed in a burette and titrated with 25 cc. of $\frac{N}{10}$ iodine. The amount of SO_2 present as normal sulphite is then found by subtracting from the total SO_2 the amount present as bisulphite. To determine the amount of sulphate 100 cc. of the solution is placed in an Erlenmeyer flask, and 1 cc. of concentrated hydrochloric acid and a few drops of alcohol are added. The air in the flask is replaced by carbon dioxide, and the solution is heated and precipitated with a 10 per cent solution of barium chloride.

Hydrogen ion concentrations of various indicator end-points in dilute sodium hypochlorite solutions, G. E. CULLEN and J. H. AUSTIN (*Jour. Biol. Chem.*, 34 (1918), No. 3, pp. 553-568, fig. 1).—A study is reported of the end-points of the indicators, powdered phenolphthalein, an alcoholic solution of phenolphthalein, and an alcoholic solution of *o*-cresolphthalein in dilute sodium hypochlorite solution with a view to the preparation of Dakin's solution.

It was found that the end-points to the various indicators in the order mentioned in a 0.5 per cent sodium hypochlorite solution were at a p_H of 10, 8.5 to 8.8, and 9.3. The first gave a solution of too high and the second of too low alkalinity for clinical use. From a study of the carbonate concentration employed in the titration with the third indicator, which gave an end-point at a satisfactory hydrogen ion concentration, it has been found that Dakin's solution having the required p_H of about 9.4 can be readily prepared by passing chlorine gas through a sodium carbonate solution of an initial concentration of 14 gm. to the liter until sodium hypochlorite is formed in a concentration of 0.5 per cent as shown by titration with thiosulphate. A solution thus prepared has proved very satisfactory for clinical purposes.

Fractionating apparatus for petroleum oils and other products, E. HINE (*Ann. Falsif.*, 11 (1918), No. 111-112, pp. 39-43, fig. 1; *Ann. Chim. Analyt.*, 23 (1918), No. 6, pp. 117-120, fig. 1; *Compt. Rend. Acad. Sci. [Paris]*, 165 (1917), No. 23, pp. 790-793, fig. 1; *abs. in Chem. Abs.*, 12 (1918), No. 11, p. 1137).—An apparatus is described in which the fractionation is effected by heating the liquid in six flasks in which are sealed condensing tubes connected at the bottom with siphon tubes passing through the flasks. In the flasks are placed as heating agents, liquids whose boiling points correspond to the initial and maximum boiling points of the desired fractions, the first flask containing the liquid with the highest boiling point. The uncondensed vapors pass into the succeeding tube and the condensed liquid is drawn off by means of a siphon tube.

A diagram is given of the apparatus.

A study of the glucosazone reaction, I. D. GARARD and H. C. SHEEMAN (*Jour. Amer. Chem. Soc.*, 40 (1918), No. 6, pp. 955-969, figs. 2).—The investigations reported were undertaken to determine definitely the conditions affecting the glucosazone reaction and the effect of some substances other than glucose, and to improve the method for the detection of glucose when present in very small amount with a large amount of some other carbohydrate. The effects of the concentration of the reagent, acidity of the reaction, concentration of sugar in the mixture, and duration of the reaction were studied. The following conclusions were drawn:

"The correct melting point of phenylglucosazone is 208° C. regardless of the method of purification. There is a concentration of phenylhydrazine which produces a maximum yield of glucosazone; any increase in the concentration above this results in a rapidly decreasing yield, probably due to the increased solubility of the osazone in the reagent. The efficiency of the reagent depends upon the acidity and is independent of the negative ion of the acid used. The range of acidity in which the reaction takes place is rather slight, between $p_H = 4$ and 6. The maximum lies close to 4.7 and is best secured with acetic acid and sodium acetate. Very slight change in acidity takes place during the reaction. Within fairly wide limits a variation of the size of the sugar sample used has very little effect on the percentage yield of osazone beyond the effect due to the constant loss which results from the solubility of the osazone. While maltose and dextrin retard the formation of the precipitate, lactose retards it to a greater extent and starch has very little effect."

The authors state that a knowledge of the various factors above recorded makes it possible to interpret the results of an osazone reaction in a wider

variety of cases than has been possible heretofore. As an illustration analytical methods are given on a typical problem.

The application of optical methods of identification to alkaloids and other organic compounds, E. T. WHERBY (*U. S. Dept. Agr. Bul. 679 (1918), pp. 9*).—This publication describes the apparatus and methods employed for the determination of optical constants of crystalline alkaloids. The instrument used is the petrographic microscope with which observations are made in ordinary light, parallel polarized light, and convergent polarized light. Samples for examination are prepared by gently crushing the dry substance, immersing a small amount of it in a drop of a liquid in which it is insoluble on a glass slide, and testing it by a small cover glass. If the sample is a drug mixture the alkaloid contents may be extracted with chloroform, dried, taken up in benzene, and allowed to stand until the solvent is nearly evaporated. Single large drops of the concentrate are placed on several microscopic slides and immediately protected by cover glasses. When the benzene is completely volatilized, the immersion liquids are introduced and the observations made.

The method is said to be successful in establishing the identity of crystalline alkaloids, even when mixed in widely different proportions.

Bacteriological examination of canned foods, A. W. and K. G. BITTING (*Nat. Canners Assoc. Bul. 14 (1917), pp. 45, pls. 2, figs. 20*).—The authors state that the bacteriological examination of canned foods usually has for its object one of three things: First, to determine whether foods which appear normal are sterile; second, to determine whether foods which appear to be defective are sterile, and if not sterile whether the spoilage is due to underprocessing or to leaks; and, third, to determine from the finished product the character of the original material. In this bulletin the subject is discussed from these points, and detailed directions are given for the examination of the canned foods and the interpretation of results.

A brief outline of literature on the counting of organisms is appended.

Cocoas treated with alkali in distinction from natural cocoas, ROCQUES and LEPLEIN (*Ann. Palsif., 11 (1918), No. 111-112, pp. 19-26; abs. in Analyst, 43 (1918), No. 507, pp. 217, 218*).—Analyses of cocoas according to the method previously noted (*E. S. R., 37, p. 414*) are reported. The authors emphasize the necessity of not only establishing a maximum quantity of alkaline carbonates to be allowed, but of prescribing that the cocoa thus treated should preserve an acid reaction.

The water content of true final cane molasses, H. C. P. GEERLIGS (*Internat. Sugar Jour., 20 (1918), No. 233, pp. 214-218; abs. in Jour. Soc. Chem. Indus., 57 (1918), No. 13, p. 385 A; Chem. Abs., 12 (1918), No. 16, p. 1769*).—The author states that the exhaustion of molasses is best and fluidity greatest at a refractive figure for the dry substance of 84°, corresponding to a water content of 16 per cent. Assuming the figure for refraction of the molasses to be that of the dry substance and the quotient of purity to be the relation between sucrose and dry substance, the amount of sucrose present in the mother liquor and also in the mother liquor after it has been diluted to 84 per cent of dry substance can be calculated.

A table is given of a number of analyses of such molasses.

Determination of acidity in condensed milk, M. DUGARDIN (*Ann. Chim. Analyt., 23 (1918), No. 4, pp. 83, 84; abs. in Chem. Abs., 12 (1918), No. 15, p. 1569*).—The acidity is determined by diluting 10 gm. of the condensed milk with 25 cc. of distilled water from which the carbon dioxid has been removed by boiling. The liquid is then titrated with $\frac{N}{10}$ sodium hydroxid with phenol-

phthalein as an indicator and the result calculated as percentage of lactic acid.

Examination of pure samples and samples manifestly altered led to the conclusion that condensed milk can be considered unaltered if the acidity expressed as lactic acid per 100 gm. of material is below 0.5 gm., as altered those whose acidity lies between 0.5 and 0.75 gm., and as entirely unfit for consumption all milk whose acidity exceeds 0.75 gm.

Detection of added color in butter or oleomargarin, H. A. LUES (*Indus. and Engin. Chem.*, 10 (1918), No. 6, pp. 436-439, fig. 1; *abs. in Chem. Abs.*, 12 (1918), No. 16, pp. 1670, 1671).—The author discusses some of the qualitative tests in use for the detection of added colors in fats and suggests certain modifications in the methods employed. The methods for separating azo colors from fats, described by Mathewson (*E. S. R.*, 36, p. 714), are criticized, and a new method of procedure for the separation from fats and the identification of yellow A B and yellow O B is described in detail.

Determination of the purity of castor oil, CHERCHEFFSKY (*Ann. Chim. Analyt.*, 23 (1918), No. 4, pp. 75-81, fig. 1; *abs. in Chem. Abs.*, 12 (1918), No. 1, p. 1518; *Analyst*, 43 (1918), No. 507, pp. 218, 219).—The author criticizes the methods of Frabot, previously noted (*E. S. R.*, 39, pp. 109, 110), for determining the purity of castor oil by difference in solubility in appropriate solvents on the ground that the results obtained are uncertain, due to the differences in age and acidity of the oil examined and to differences in composition of the petroleum ether used as a solvent. As a substitute method a determination of the critical temperature of solution is recommended. This is the temperature at which the solution of a fat in an appropriate solvent becomes turbid on heating when the temperature is higher than the boiling point of the solvent. The method is as follows:

Into a glass tube about 9 or 10 cm. long and 6 or 8 mm. in diameter a few drops of the oil to be examined are introduced, together with an equal number of drops of the selected solvent. The tube is then fastened to the bulb of the thermometer, which is gently heated in a bath of sulphuric acid or glycerol. When the liquid in the tube has become homogeneous the bath is allowed to cool and the temperature at which turbidity is produced represents the critical temperature of solution. This constant is fixed for each fatty substance and as a function of the solvent employed.

With 85 per cent ethyl alcohol as a solvent, castor oil of the first pressing gave a reading of 66° C. and oil of the second pressing 67°. Tables are given of the effect on this reading of various percentages of other oils. The presence of two parts per 100 of a foreign oil in castor oil increases the critical temperature by from 3 to 5°.

The method is considered by the author to be the simplest and most accurate for the determination of the purity of castor oil.

Determination of the purity of castor oil, C. FRABOT (*Ann. Chim. Analyt.*, 23 (1918), No. 6, pp. 120-125).—This is a refutation of the criticism of Chercheffsky, noted above, in regard to the determination of the purity of castor oil by means of solubility in petroleum ether.

Moisture content of plantation rubber in Java, O. DE VRIES (*Arch. Rubbercult. Nederland. Indië*, 2 (1918), No. 1, pp. 45-54).—This paper contains a preliminary review of moisture determinations in samples of plantation rubber received for testing at the Central Rubber Station during the months of October to December, 1917. In 54 samples of first latex crepe from 18 estates the moisture content varied from 0.34 to 1.01 per cent, the average being 0.67 per cent. Up to 1 per cent must be considered as a normal moisture content for the season. Moisture determinations on 96 samples of smoked sheet from 25 estates